

(19) World Intellectual Property Organization
International Bureau



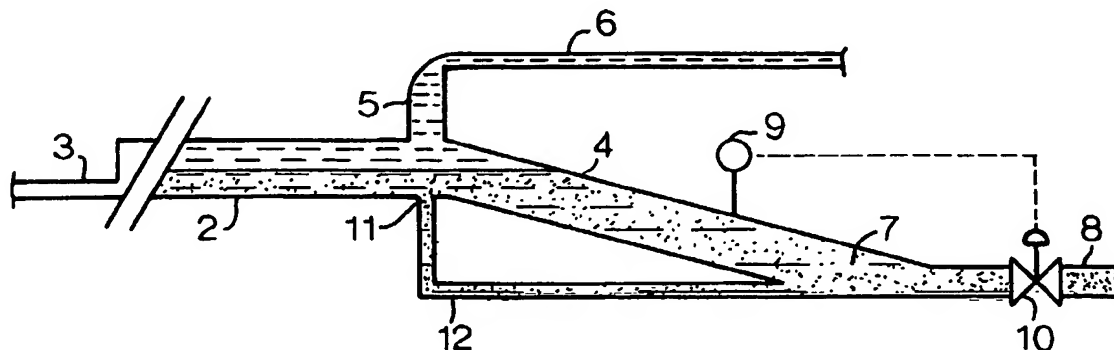
(43) International Publication Date
2 October 2003 (02.10.2003)

PCT

(10) International Publication Number
WO 03/080212 A1

- (51) International Patent Classification⁷: B01D 17/032, 17/12
- (21) International Application Number: PCT/EP03/03170
- (22) International Filing Date: 24 March 2003 (24.03.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
02252120.7 25 March 2002 (25.03.2002) EP
- (71) Applicant (for all designated States except CA, US): SHELL INTERNATIONAL RESEARCH MAATSCHAPPIJ B.V. [NL/NL]; Carel van Bylandtlaan 30, NL-2596 HR The Hague (NL).
- (71) Applicant (for CA only): SHELL CANADA LIMITED [CA/CA]; 400, 4th Avenue S.W., Calgary, Alberta T2P 2H5 (CA).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): PUIK, Eric, Johannes [NL/NL]; Volmerlaan 8, NL-2288 GD Rijswijk (NL).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD AND DEVICE FOR SEPARATING A MIXTURE OF FLUIDS



(57) Abstract: A mixture of fluids is separated into at least two phases, one of which has a higher density than the other, passing the mixture through a normally horizontal supply pipe, by creating a stratified flow in the supply pipe, by passing the mixture through an inclined pipe, whilst maintaining a stratified flow in the inclined pipe, by extracting fluid with lower density ("lighter phase") via a first discharge system and fluid with a higher density ("heavier phase") via a second discharge system, wherein the interface between the lighter phase and the heavier phase is monitored in the inclined pipe by a level controller means that varies the flow of the fluid of higher density to keep the interface between set levels. The invention also provides a device for employing this method.

WO 03/080212 A1

INTERNATIONAL SEARCH REPORT

International Application No

T/EP 03/03170

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 B01D17/032 B01D17/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B01D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 044 711 A (SHELL INTERNATIONAL RESEARCH MAATSCHAPPIJ) 18 October 2000 (2000-10-18) cited in the application the whole document ---	1,3-13, 17,24
A	DATABASE WPI Week 199745 Derwent Publications Ltd., London, GB; AN 97-488029 XP002116078 & RU 2 077 364 C (KHAZIEV), 20 April 1997 (1997-04-20) cited in the application abstract --- -/--	1

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

26 June 2003

Date of mailing of the international search report

11/07/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Bertram, H

INTERNATIONAL SEARCH REPORT

International Application No

T/EP 03/03170

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 660 414 A (G.J.HATTON ET AL.) 28 April 1987 (1987-04-28) the whole document ---	1,17
A	US 5 378 353 A (B.KOCH) 3 January 1995 (1995-01-03) the whole document ---	1,17
A	US 4 563 274 A (S.ROTHON ET AL.) 7 January 1986 (1986-01-07) the whole document -----	1,17

INTERNATIONAL SEARCH REPORT

International Application No

T/EP 03/03170

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1044711	A	18-10-2000	EP 1044711 A1	18-10-2000
			CA 2304924 A1	12-10-2000
			CN 1270075 A	18-10-2000
			GB 2348831 A ,B	18-10-2000
			NO 20001841 A	13-10-2000
			US 6468335 B1	22-10-2002
RU 2077364	C	20-04-1997	RU 2077364 C1	20-04-1997
US 4660414	A	28-04-1987	CA 1296927 C	10-03-1992
			DE 3622669 A1	19-03-1987
			DK 435986 A	13-03-1987
			GB 2180352 A ,B	25-03-1987
			NO 863555 A ,B,	13-03-1987
US 5378353	A	03-01-1995	DE 4110726 A1	08-10-1992
			DE 59204089 D1	30-11-1995
			EP 0508144 A1	14-10-1992
US 4563274	A	07-01-1986	GB 2146253 A	17-04-1985
			BE 900545 A1	11-03-1985
			DE 3432218 A1	28-03-1985
			ES 8502882 A1	01-05-1985
			FR 2551679 A1	15-03-1985
			JP 60078688 A	04-05-1985